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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/976,194	10/11/2001	Joel C. VanderZee	D-2737/WOD	1444

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EXAMINER	
WEST, JEFFREY R	

ART UNIT	PAPER NUMBER
2857	

DATE MAILED: 12/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/976,194	VANDERZEE ET AL.
	Examiner	Art Unit
	Jeffrey R. West	2857

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 December 0202*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 October 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2 and 3*.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: "290" (Figure 4). A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> **The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.**

3. Claims 15 and 34 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 15 and 34 recite limitations for generating "a true three-phase power factor data value by filtering said set of instantaneous three-phase power factor data values" however this limitation is not sufficiently described in the specification to one

having ordinary skill in the art. The specification fails to mention any filtering and therefore it is unclear to one having ordinary skill in the art what type of filtering is implemented and how the filtering is used to obtain the true three-phase power factor data value.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 40 and 42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 40 and 42 are rejected under 35 U.S.C. 112, second paragraph, because they recite limitations for "averaging the instantaneous power factor over a line cycle to determine power factor". This limitation is considered to be vague and indefinite because claim 39 already defines "power factor" as "an instantaneous power factor" and, therefore, it is unclear to one having ordinary skill in the art how one can average the power factor in order to determine power factor.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 2, 20, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,673,196 to Hoffman et al.

Hoffman discloses vector electricity meters and associated vector electricity metering methods comprising a processor (column 8, lines 1-19) for simultaneously sampling voltage levels and current levels from power source lines of a three-phase power system to form a set of voltage and current levels (column 3, lines 49-53 and Figure 1), wherein the processor is responsive to the set of voltage and current levels to generate a data value representative of an instantaneous three-phase power factor (column 3, lines 53-55 and 62). Hoffman also discloses that the processor is responsive to a voltage level subset and a current level subset of the set of voltage and current levels to generate vectors as part of generating the value representative of the instantaneous three-phase power factor wherein the voltage level subset comprises three phase voltage levels sampled from each of the three power source lines relative to a common voltage line (column 4, lines 24-30, column 7, lines 57-61, and Figure 1) and/or three line voltage levels sampled from a first power source line relative to another power source line (column 4, lines 12-19, column 7, lines 57-61, and Figure 1) and also wherein the current level subset comprises three phase current levels sampled from each of the three power source lines (column 4, lines 24-30, column 7, lines 57-61, and Figure 1) and/or three line current levels sampled from each of the three power source lines (column 4, lines 12-19, column 7, lines 57-61, Figure 1, and column 10, lines 26-32).

Hoffman also discloses sampling the plurality of sets of voltages at a predetermined sampling rate over a predetermined time interval to distribute the sample locations in the line cycle period (column 4, lines 19-23 and 30-49).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> **(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.**

9. Claims 3-12, 22-31, 39, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,673,196 to Hoffman et al.

As noted above, the invention of Hoffman teaches all of the features of the claimed invention except for calculating real and imaginary components as a phasor and specifying that the three line voltages be taken with respect to each other (i.e. a first line voltage level sampled from a first source line relative to a second source line, a second line voltage level sampled from the second source line relative to a third source line, and a third line voltage level sampled from the third source line relative to the first source line).

Although the invention of Hoffman teaches performing calculations based on vectors rather than real and imaginary parts of a phasor, Hoffman does teach the equivalency of a phasor and a vector in three-phase systems (column 1, line 57 to

column 2, line 6) and the Examiner takes Official Notice that vectors and phasors are equivalent metrics in respective rectangular or polar notation representing imaginary and real components both known and easily implemented by those having ordinary skill in the art (see for example U.S. Patent No. 6,128,583 to Dowling, column 10, lines 59-61, BCIT, "What is a Phasor", Circuit-Magic, "Phasor Diagrams & Complex Numbers for AC Circuits Analysis", paragraph 1, and Saadat, "Power System Analysis", pages 33-34).

Further, although the invention of Hoffman simply refers to the voltages from each line of the three-phase system as "line voltages" without specifying that the line voltages be taken with respect to each other, the Examiner takes Official Notice that line voltages of three-phase systems, such as the systems of Hoffman, are taken with respect to each other (see for example, line voltages V_{ab}, V_{bc}, V_{ca} in Saadat, "Power System Analysis", page 32 and U.S. Patent No. 4,333,046 to Lee, column 4, lines 22-24).

10. Claims 13, 14, 16-19, 32, 33, and 35-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman in view of U.S. Patent No. 5,434,738 to Kurszewski et al.

As noted above, the invention of Hoffman teaches many of the features of the claimed invention and while the invention of Hoffman does teach determining the power factor for a supply on a load such as a motor (column 1, line 24), Hoffman does not teach continuously generating a set of instantaneous three-phase power

factor data values in order to check if a predetermined consecutive number of values are negative in order to declare a detection of a momentary power loss condition and command that the load of the system be temporarily disconnected.

Kurszewski teaches an apparatus and method for protecting induction motors from momentary power loss comprising continuously generating a set of instantaneous three-phase power factor data values (column 7, lines 35-64), determining whether the instantaneous three-phase power factor data values are negative, indicating a detection of a momentary power loss condition (column 6, lines 36-49), a plurality of consecutive times (column 9, lines 22-35) and, if so, commanding that the load of the system be temporarily disconnected (column 6, lines 18-27 and column 11, lines 36-38). Kurszewski also teaches plotting values representing the power factor as vectors with associated angles (i.e. phasors) (column 6, lines 49-64 and Figure 5).

It would have been obvious to one having ordinary skill in the art to modify the invention of Hoffman to include continuously generating a plurality of instantaneous three-phase power factor data values in order to check if a predetermined consecutive number of values are negative in order to declare a detection of a momentary power loss condition and command that the load of the system be temporarily disconnected, as taught by Kurszewski, because, as suggested by Kurszewski, the combination would have allowed for the detection of momentary power supply faults and caused shutting down the motor due to such a condition

thereby preventing costly damage to the motor and associated equipment (column 1, line 55 to column 2, line 2).

11. Claims 15, 34, 40, and 42, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman in view Kurszewski and further in view of Grady et al., "Harmonics and How They Relate to Power Factor."

As noted above, the invention of Hoffman and Kurszewski teaches all of the features of the claimed invention except for filtering and/or averaging the set of instantaneous three-phase power factor data values to generate a true three-phase power factor data value.

Grady teaches a method for determining a true power factor by determining the ratio of average power to apparent power over a plurality of harmonics (i.e. an average of a plurality of instantaneous power factors at each of the harmonics) (pages 1-2, "Power Factor in Sinusoidal Situations" and page 4, equation 14). Grady also teaches, in a separate embodiment, a method for compensating for distortion by adding shunt capacitors or active filters to remove the harmonics in order to determine the true power factor from an instantaneous//displacement power factor (page 5, paragraph 3).

It would have been obvious to one having ordinary skill in the art to modify the invention of Hoffman and Kurszewski to include filtering the set of instantaneous three-phase power factor data values to generate a true three-phase power factor data value, as taught by Grady, because the invention of Hoffman and Kurszewski

does disclose filtering the current and voltage data for aid in sampling to determine accurate metering values (Hoffman, column 5, lines 33-55) and, as suggested by Grady, the combination would have provided a method for monitoring power based upon a true power factor that takes into account the frequency-dependent impacts of voltage and current harmonics to determine accurate power factor values thereby insuring that the monitored values correctly represent the current conditions (page 8, "Conclusions").

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

U.S. Patent No. 6,128,583 to Dowling teaches a motor stator condition analyzer comprising means for determining power factors through phasor calculations.

U.S. Patent No. 5,519,300 to Leon et al. teaches a method and apparatus for analysis of polyphase electrical motor systems including means for determining power factor and power (real, reactive and apparent), not only on a per phase basis, but also the total power factor and power for the polyphase motor.

U.S. Patent No. 4,333,046 to Lee teaches power factor control of a three-phase induction motor with line voltages of V_{ab}, V_{bc}, V_{ca}.

JP Publication No. 61-243367 to Abe et al. teaches a multi-phase digital power-factor measuring apparatus.

BCIT, "What is a Phasor" teaches the well-known relationship between a phasor and a vector.

PG&E, "Understanding Electric Power Characteristics" teaches the relationship between an instantaneous power factor and a true power factor.

Circuit-Magic, "Phasor Diagrams & Complex Numbers for AC Circuits Analysis" teaches the well-known relationship between a phasor and a vector.

Saadat, "Power System Analysis" teaches relationships between line voltages and phase voltages using phasor diagrams.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey R. West whose telephone number is (703)308-1309. The examiner can normally be reached on Monday through Friday, 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (703)308-1677. The fax phone number for the organization where this application or proceeding is assigned is (703)308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

jrw

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